

# Weekly Report

**Period:** 10/15/2012 – 10/21/2012

## Research

This report records the core idea to visualize and explore the uncertainty in fiber tracking. The main contributions we want to include:

- To explore the sensitivities and correlation of different parameters used in fiber tracking;
- To visualize the discrepancies of visualizations under different configurations

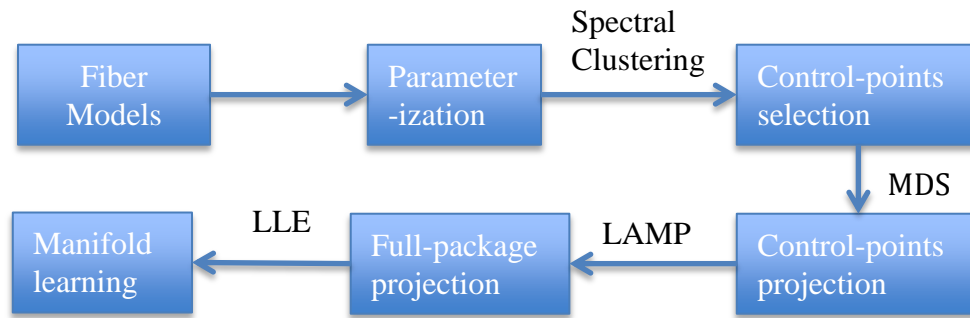


Figure 1 The main pipeline of our framework

Figure1 shows the initial pipeline of our framework. Because fibers do not have the same dimensionality, we first parameterize the fibers into the same space  $R^d$ . To guarantee the shape of each fiber,  $d$  is typically set to very large. This naturally leads to more computation resource. Instead, in our framework, we will convert fibers into a feature space which is consisted of a spatial and geometrical feature space. We use FFT to extract the geometrical feature of each fiber.

Inspired by LAMP<sup>[1]</sup>, the number of the control points has not to be big enough for example  $\sqrt{n}$ . We use spectral clustering to cluster the input fibers, and use the cluster centers as the control points for the latter full-package projection. LAMP admits interactivity during projection. This is a great advantage for interactive analysis. We choose LLE to explore the high-dimension manifold of different fiber tracking parameters.

Figure2 shows the interface implemented in this week.

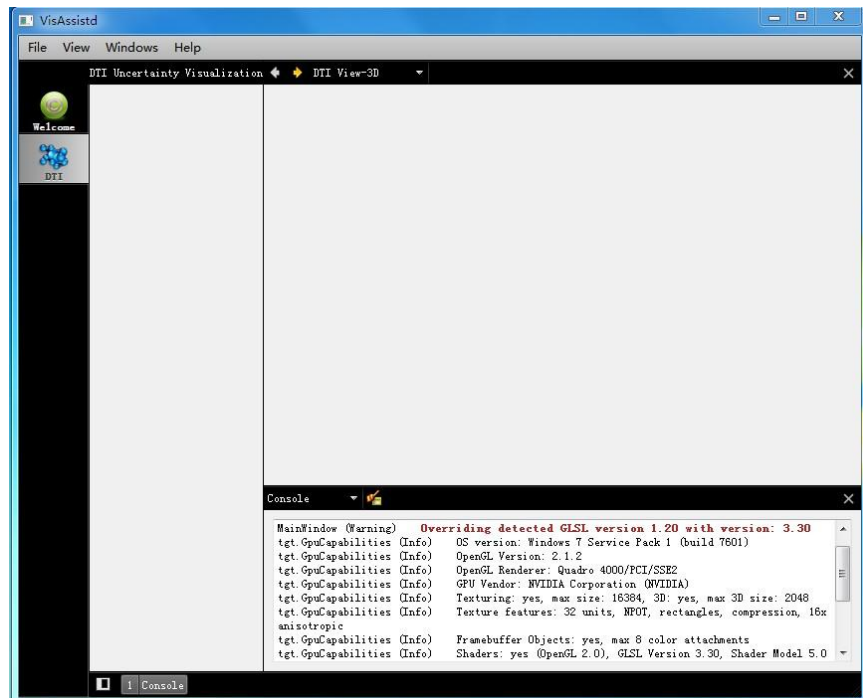


Figure 2 The initial user interface

## Miscellaneous

### Work to be done in next week

- ◆ Implement the framework stated above

#### Reference:

[1] Paulo Joia, Fernando V. Paulovich, Danilo Coimbra, et al. Local Affine Multidimensional Projection, TVCG, 2011.